



Lessons Learned – MOOC Multimodal Interaction

Gabriela Fernandes | ZEWK | MIELES | Chennai, August 12, 2019

Motivation for the MOOC Multimodal Interaction Course



Human-Computer Interaction

Syllabus Course Content

Computer Science and Engineeri...



NOC:Interaction Design

Course Content

Engineering Design ,IIT Guwahati



NOC:Introduction to Human Computer Interaction

Syllabus Course Content



NOC:Multimodal Interaction

Course Content

Computer Science and Engineeri...

- (Only few) HCI-related courses (in 2018) at NPTEL
- Existing know-how and resources at TU Berlin



Lecturers



Prof. Dr.-Ing.
Sebastian Möller



Prof. Dr.-Ing.
Jens Ahrens



Dr. Benjamin Weiss

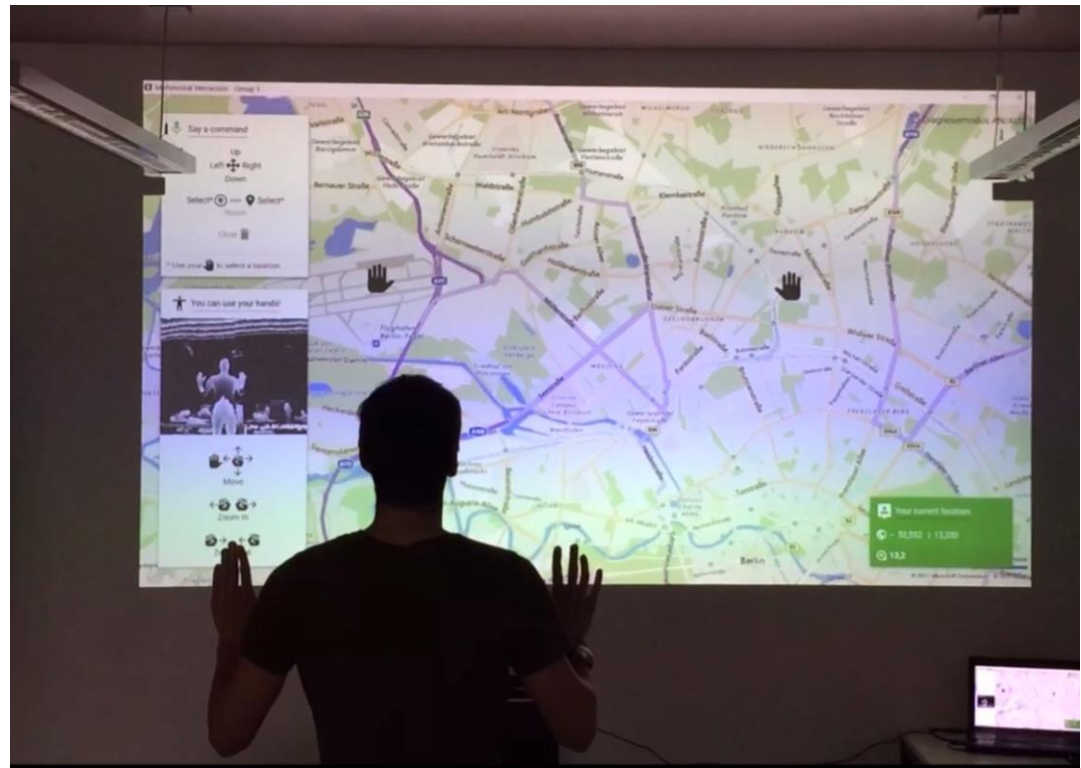


Dr.-Ing. Stefan Hillmann



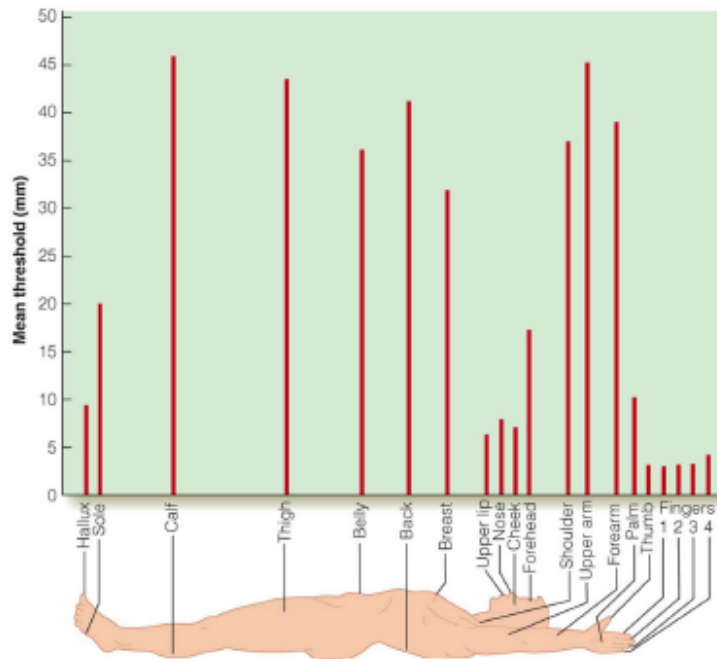
Course Content

- Multimedia and Multimodality
- Hearing and Speech
- Vision
- Other Senses
- Integration and Cognition
- Multimodal Perception
- Human Multimodal Interaction
- Multimodal Input and Output Systems
- Multimodal Interactive Systems
- Virtual Environments

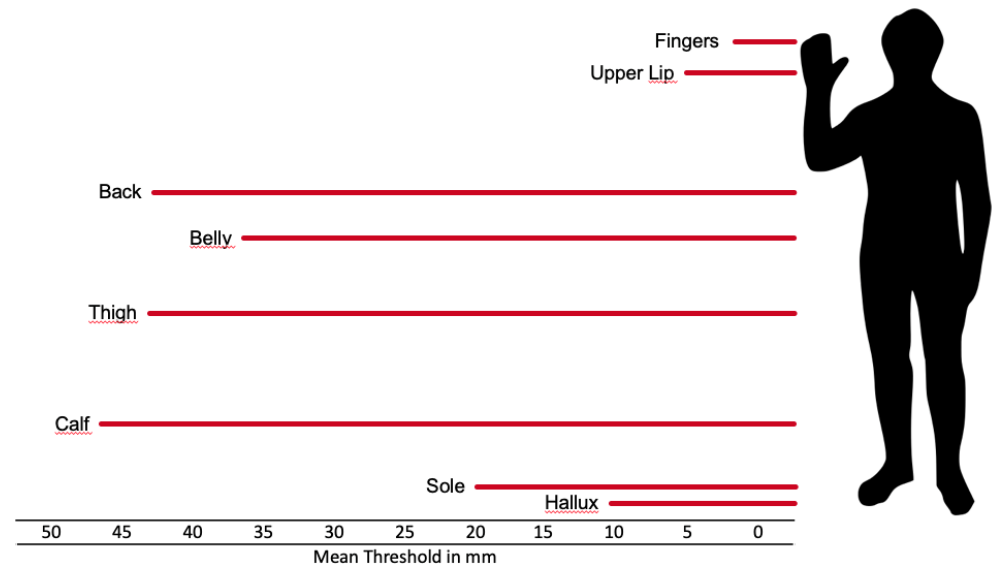


Revision of the Teaching Material (Copyright and Didactics)

Old



New



Goldstein, 2009
Fig. 14.10



Course Creation

Material:

- 4 topics were completely revised and newly post-produced:
Multimedia and Multimodality, Hearing and Speech, Vision, Other Senses
- 1 completely new topic produced: [Audio in Virtual Environments](#)
- New introductions to all topics produced
- New weekly assignments created
(instead of a manually graded programming task)
- 1 new electronic exam was developed



Course Creation

Course at NPTEL

- Strong support by different teams at NPTEL:
course creation, examination and assignments, video transcriptions
- All videos were uploaded and integrated in the lessons
- Exams and assignments were implemented and checked by two-men rule
(4-eyes authorization)
- Transcriptions of all videos
- And of course the operation of the entire infrastructure by NPTEL



Recording Process and Teaching Assistants

- All videos created by professors themselves and shared with IITM team.
- Faculty managed the courses themselves.
- Support extended by IITM in configuring the assignments and the end exam.
- Both automatically computer graded and manually graded (open) assignments were given.

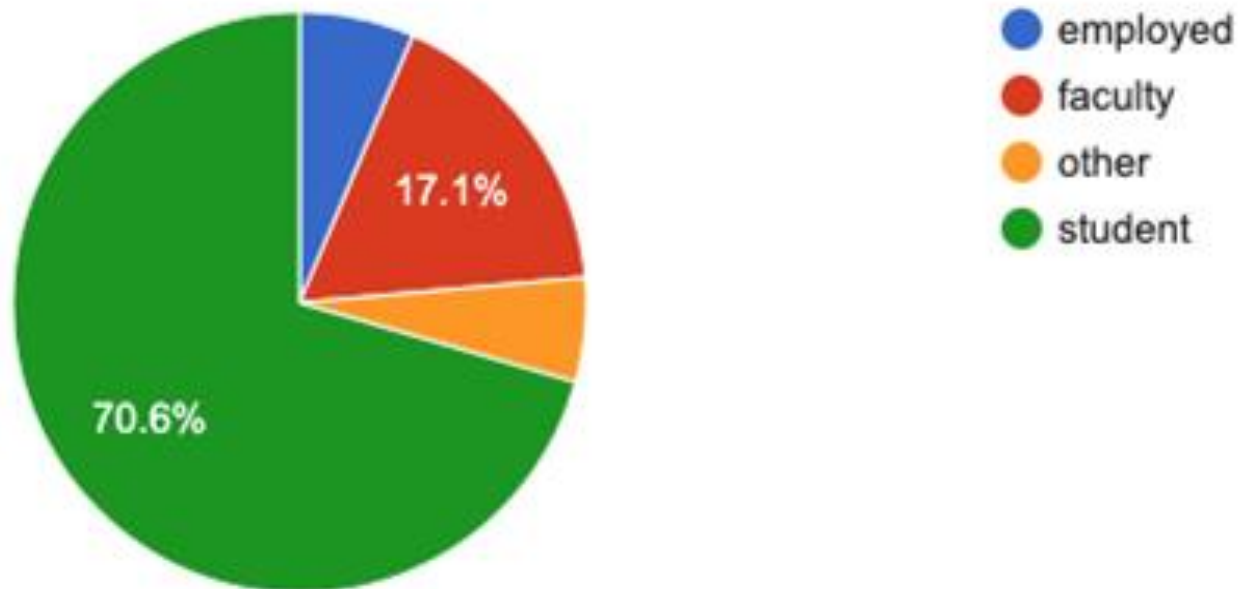


Running the Course

- 4 weeks (February 25 until March 24, 2019)
- "business as usual" in a MOOC:
 - Answering questions in the forum
 - Publishing material in time (thanks to NPTEL again)
 - grading of assignments (problems with plagiarism for one question)
- Exams were carried out in late April, 2019

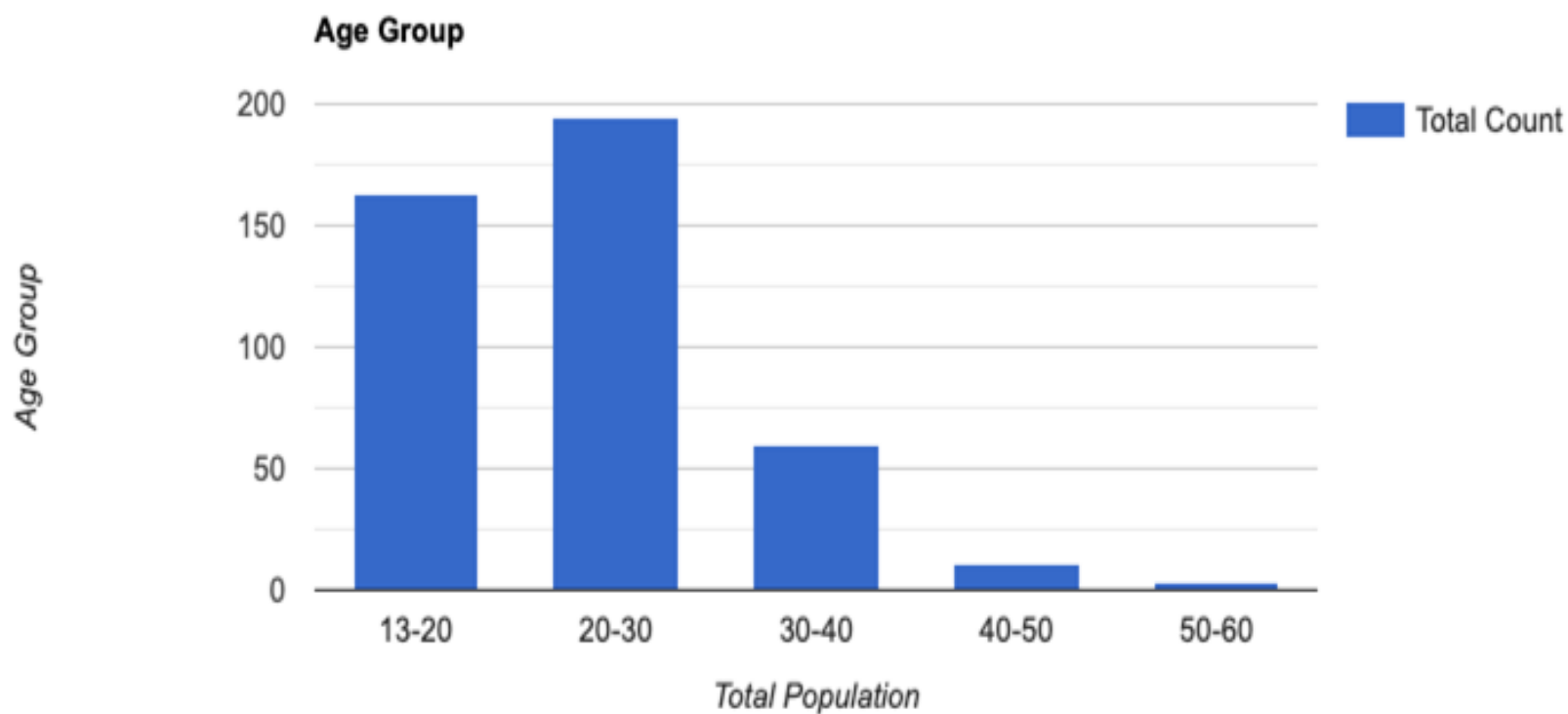
Enrollments – Role

Charts Type :- Role Details



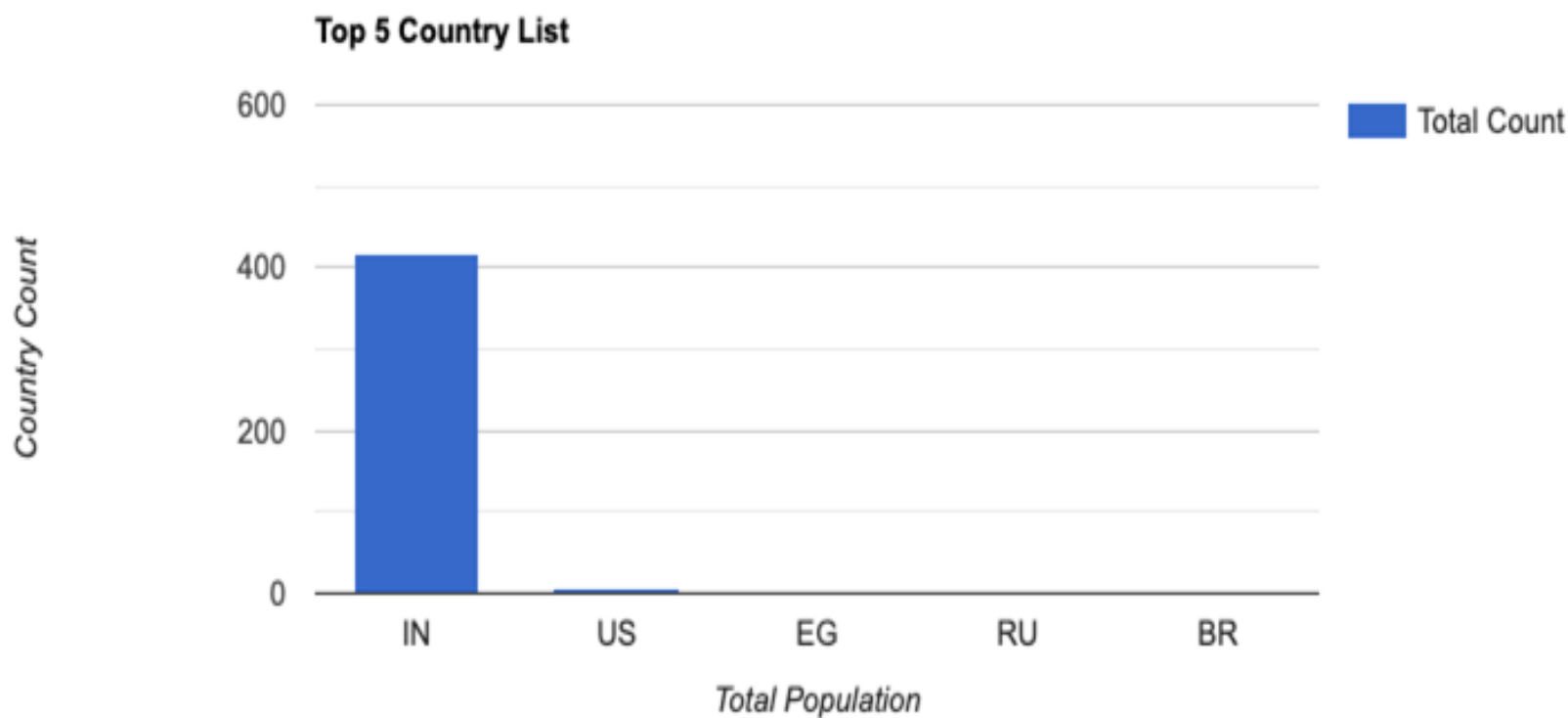


Enrollments – Age



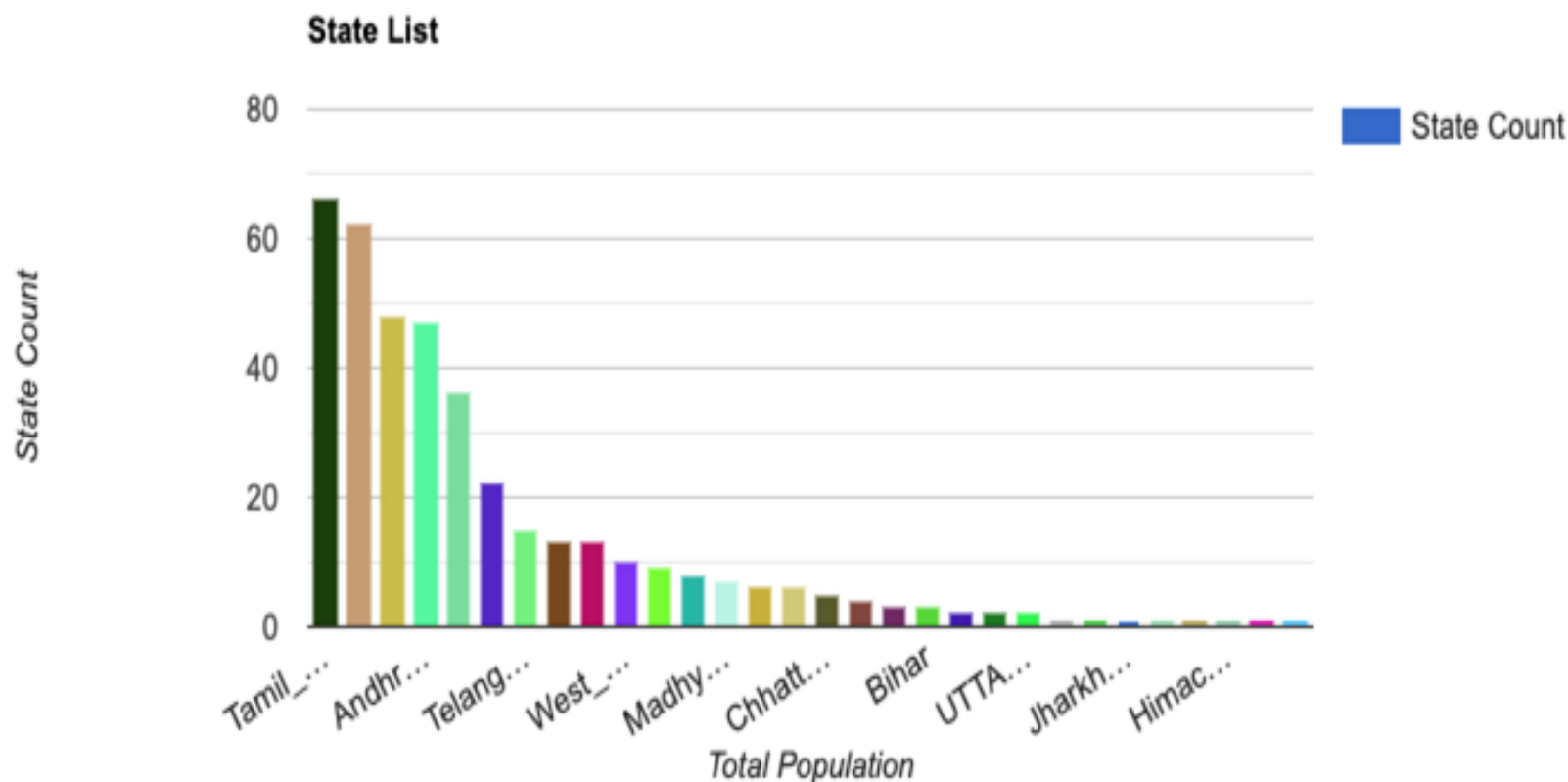


Enrollment – Countries



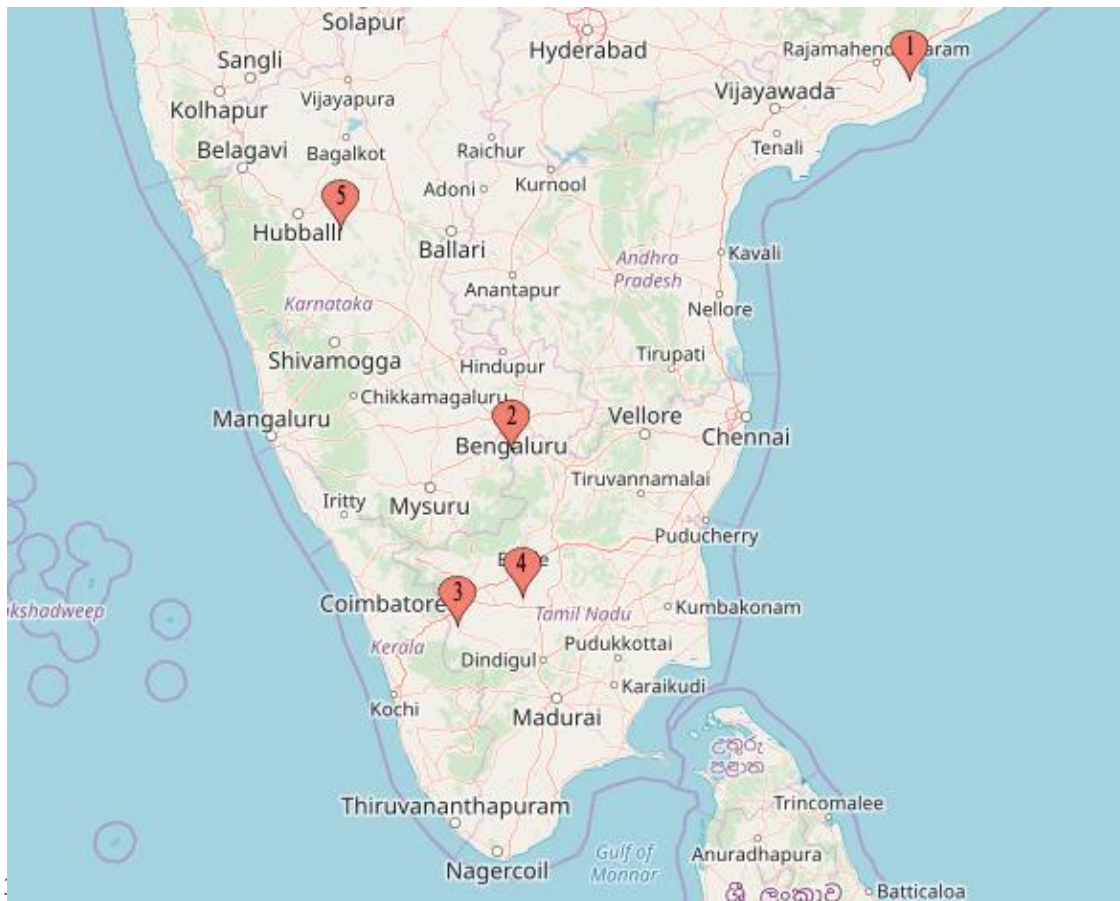


Enrollments – States





Enrollments – Top 5 Colleges



1. ADITYA ENGINEERING COLLEGE, SURAMPALEM, **ANDHRA PRADESH.**
2. NEW HORIZON COLLEGE OF ENGINEERING, BENGALURU, **KARNATAKA.**
3. PSG COLLEGE OF ARTS & SCIENCE, COIMBATORE, **TAMIL NADU.**
4. KONGU ARTS AND SCIENCE COLLEGE, ERODE, **TAMIL NADU.**
5. SMT KAMALA AND SHRI VENKAPPA M AGADI COLLEGE OF ENGINEERING AND TECHNOLOGY, GADAG, **KARNATAKA.**



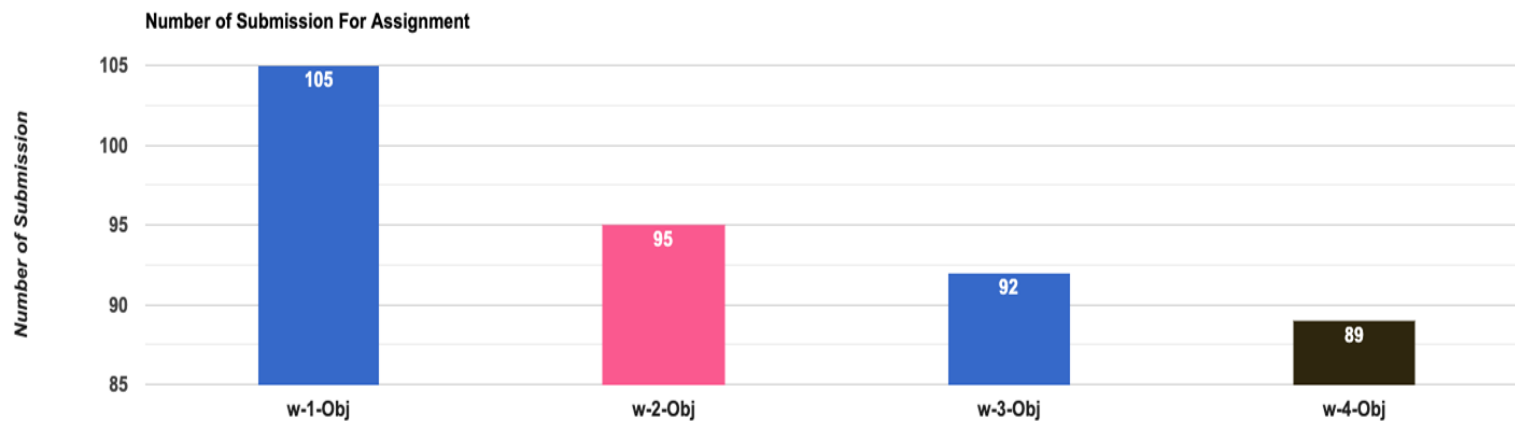
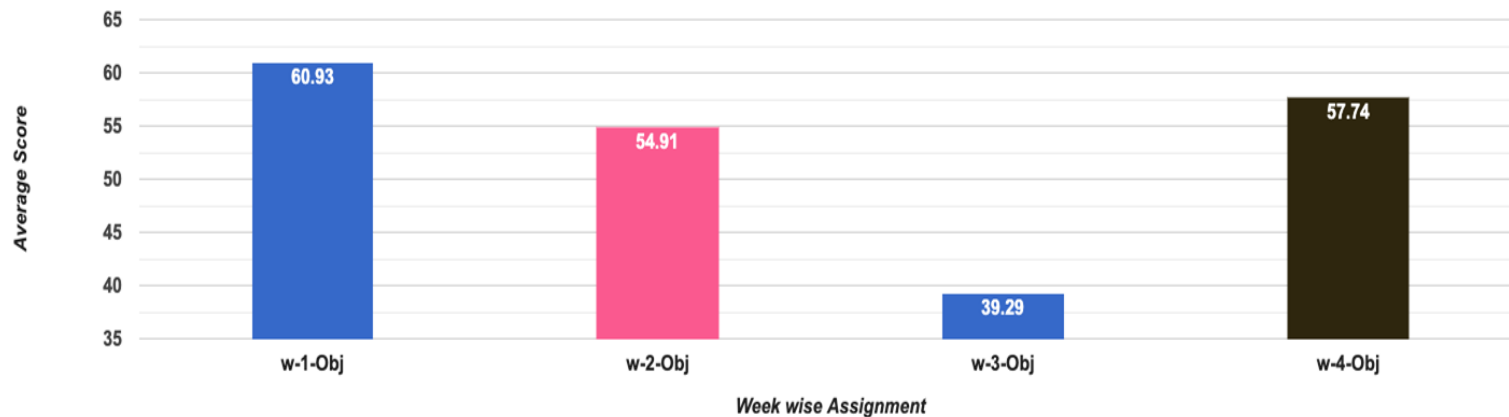
Weekly Assignments – Submissions and Scores

Week	Submissions	Average assignment score
1	105	60.9
2	95	54.9
3	92	39.3
4	89	57.7



One question was removed afterwards because of unclear wording of the task.

Weekly Assignments – Submissions and Scores





Plagiarism in Assignments

Task:

“Describe the difference between Multimedia and Multimodality in maximal 600 Words.”

Answers:

- Copy and Paste from a scientific article (33)
 - No one referred the article
 - Often even copy of formatting and references to (not copied) figures and literature

Question Types in Assignments and Exams

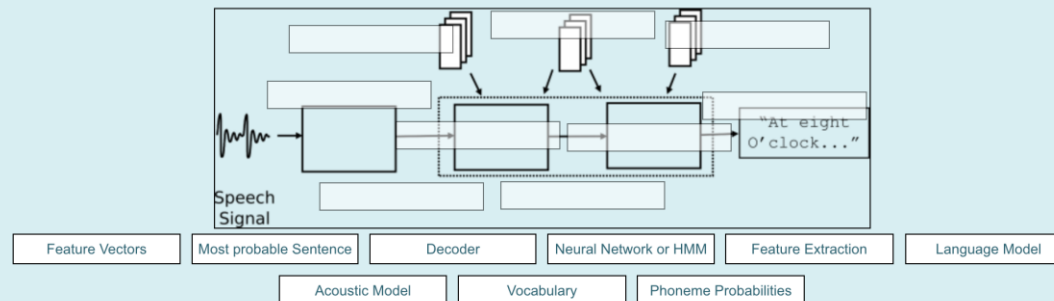
Compared with Moodle or platforms like edX: Drag & Drop or cloze text are missed

Rods and Cones

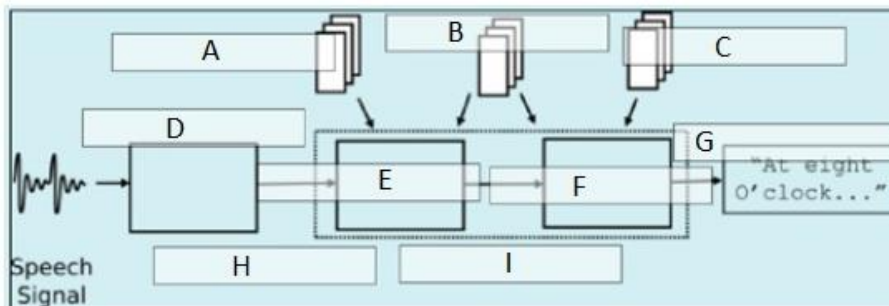
Select the correct words in the following sentences!

On the retina, there much more than . Cones are , while rods are .

Drag and drop each term to its corresponding part in the scheme of a speech recognition model.



Drag and Drop Workaround (9 mc questions with 9 options)



Sub questions

Question Number : 31 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Question Label : Multiple Choice Question

Select the correct answer which suits the box A

Options :

- ✗ Neural Network or HMM
- ✗ Most probable Sentence
- ✗ Feature Vectors
- ✗ Decoder
- ✗ Vocabulary
- ✗ Feature Extraction
- ✗ Phoneme Probabilities
- ✓ Acoustic Model
- ✗ Language Model



Level of learning objective (Bloom): Knowledge

Question:

What are the 4 aspects of a message according to Schulz v. Thun?

Example for answer:

1. Factual information
2. Self-revealing
3. Relationship
4. Appeal

Only 1 or 2 right answers.
Most students got 0 or 1 point (of 4).

Student No	NOTE: Your answer should not exceed 50 words.
1	ear nose tounge lip hand teeth mouth leg hip haap
2	selection insertion merging execution
3	heading body conclusion
4	fine details hand grip control strechting vibration
5	subject reason commenting questioning
6	addition subtraction division multiplication
7	shared infomation relative information relation information multimodal information



Level of learning objective: Understanding/Application

Question:

Name two reasons why Embodied Conversational Agents (ECAs) are meaningful as user interface.

Answers:

1	THE RATIO IN WHICH THEY ARE PRESENT ARE IRRATIONAL WHICH IS NOT BENEFICIAL TO USER INTERFACE
2	first reason is long time memory which is used in embodied conversational agents. second reason is short time memory which is used in embodied conversational agents.
3	1.The ECA'S are very useful as they give a platform to the user to act as an interface. 2.They help in the easy transfer of data between system & user.
4	Embodied Conversational Agents are used as an interface as the interaction between human and human, human and machine.
5	ECA means Embodied Conversational agents ECA is user interface because it is used to make the conversation between the two unknowns so that they can know each other and become friends

One student got full points, half of the students 1 point and the other half 0 points.

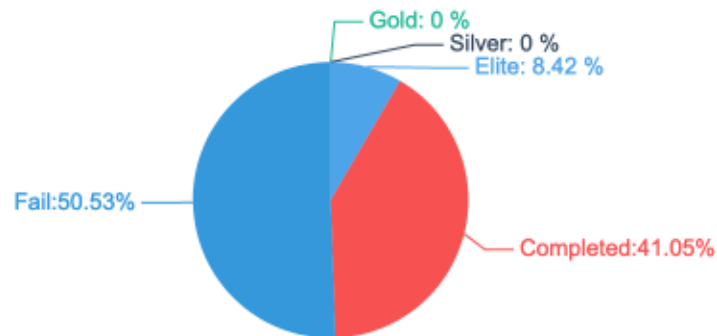


Check for Problematic Questions

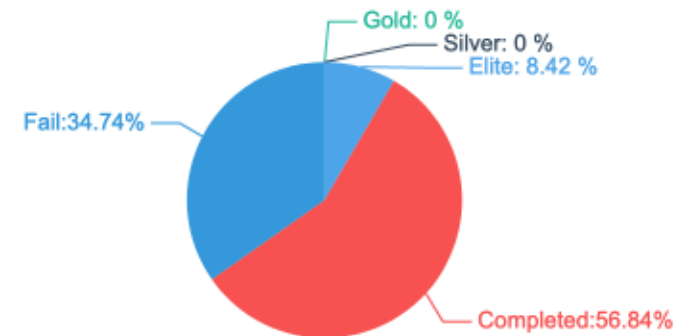
- Review of all questions with regard to the percentage of correct answers by
 - ... the toppers
 - ... the other participants
- One wrong “correct” option was found (MC question)
- One missing option was modified (drag & drop work around MC question)
- Good tool to identify questions with wrong correct answers

Course Results and Moderation

Performance Before Moderation



Class Performance After Moderation



Course Results (before Moderation)

Student Participation

432

Enrolled Candidates

101

Registered

95

Present

Results

0

Gold (90 and above)

0

Silver (75-89)

7

Elite (60-74)

35

Completed(40-59)

53

Failed(less than 40)



Moderation of Course Results

- Probably good for the fine-tuning of new courses, but what is the intended use (potential discussion point for this session)
- Check for questions correctly answered by all / toppers is helpful to identify wrongly configured questions
- But: We saw no tool to analyze results of single questions in assignments and exam -> item analysis



Student's Feedback I

- Lecturers speech are very clear. **Showing examples of the concepts in video is phenomenal. Appreciate the fact the lecturer/session video is not beyond 30 min**
- Good exposure to the content.
- Tough to answer and understand the concepts...
- Content **should be a bit more practical.**
- Interesting course.
- The lecture delivered by Dr. Rahul Swaminathan was very informative, easy to grasp and understand. It was well organized and seamlessly delivered. **In the remaining videos accent was an issue.**
- Content is a bit monotonous in terms of its application



Student's Feedback II

- The Content delivered in week 4 is very good and clear. **Examples shown in the videos in relation to each topic helped to understand/relate the concept easy.**
- From the presentation view point i.e. **clarity** of lecturer speech (without echo) & seeing the slides should have been as how it was till week 3 i.e. With Dr. Rahul and with Jens the tone of voice could have been better.
- Prof. Dr.-Ing. Sebastian Möller. Dr. Rahul & Prof. Dr.-Ing. Jens Ahrens have delivered the content really well **but the body language is very casual.**



Potential Discussion Points

- Differences in Learning and / or Teaching cultures
 - Same course at TU Berlin: ~ 90 % passed, mean grade: ~ 80 %
(vs. ~ 50% passed on NPTEL-course, after moderation ~ 60%)
 - Plagiarism is very rare (2 cases in 3 runs (in total ~300 students))
- Is there a goal regarding mean grading result in a course or partition of passed students?
- Which style of video recording is preferred by Indian students?
 - (casual style seems to be preferred by EU and US) students
- What could be further topics/fields provided by EU partners/universities in online courses?



Thank you for your attention!

Gabriela Fernandes

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Technische Universität Berlin



Soft Criteria from Meeting in Bangalore

- The proposal should include collaboration between Indian and European institutions
 - IIT Madras
 - National Programme on Technology Enhanced Learning (NPTEL), initiated by 7 IITs and IIS Bangalore ➡ large multiplier
 - TU Berlin, Chalmers University of Technology
- How can we become e-learning ambassador in our institution? We must promote the interest at our faculties.
 - Intrinsic interest at TU Berlin ➡ improvement of existing material, increased awareness
- How can we help the lower level institutions to add value using e-learning?
 - Additional teaching material for smaller institutions
- The outcome should create impact on society.
 - Hard to measure
 - Still, multimodal human-computer interaction becomes more and more relevant with AI-based natural interfaces (e.g. as indicated by smart assistants from Google, Apple, Amazon etc.)



Hard/Technical Criteria from Meeting in Bangalore

- Scalability issues
 - MOOCs designed to scale
 - (manual grading of one assignment has to be replaced)
- Lack of Internet Band
 - NPTEL maintains a service to exchange course content by courier
 - (further thoughts on that topic are planned for tomorrow)
- Language differences (diversity)
 - The course is in English
 - (2 examples used in the course are very German-centric and should be replaced)